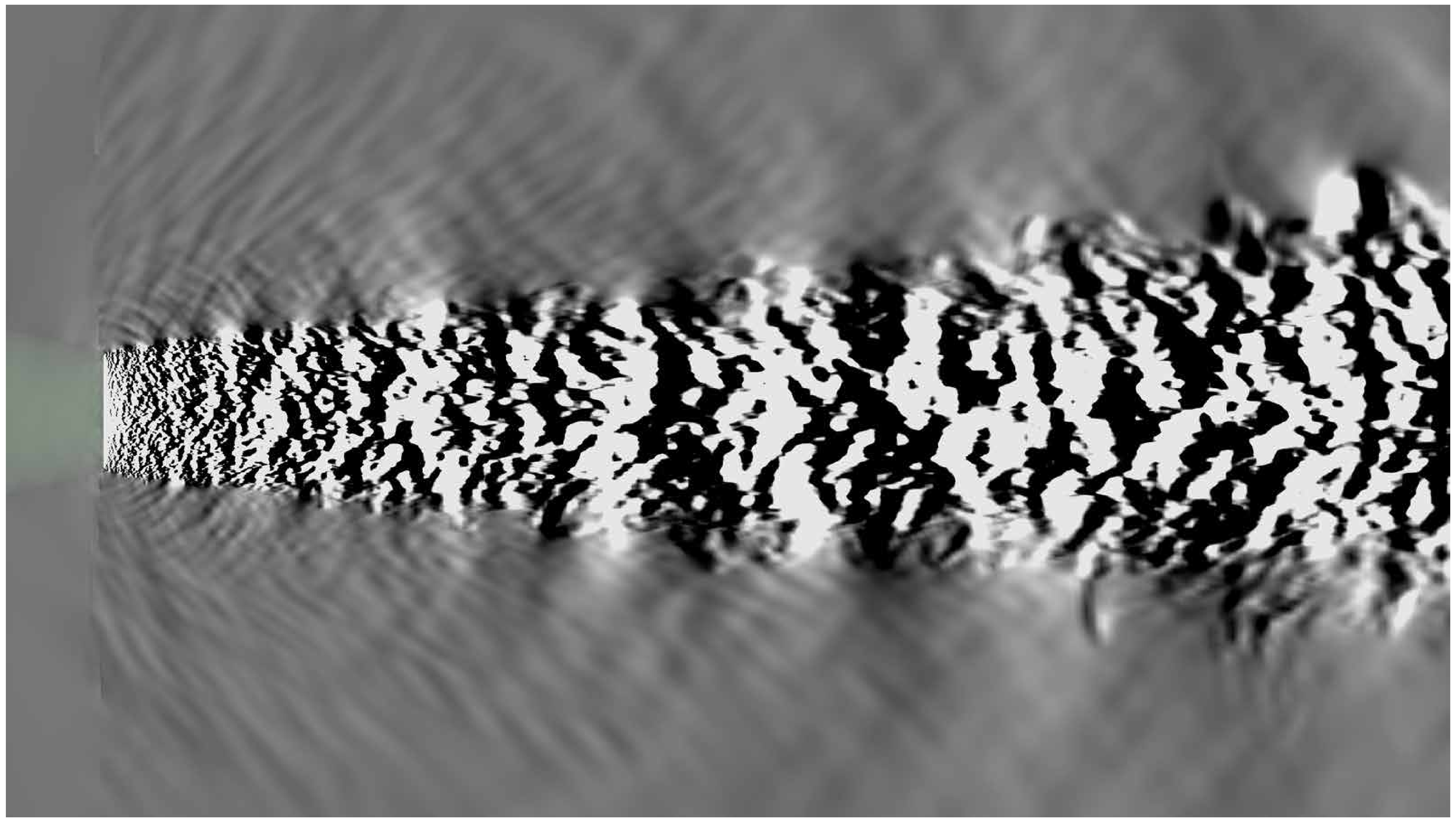
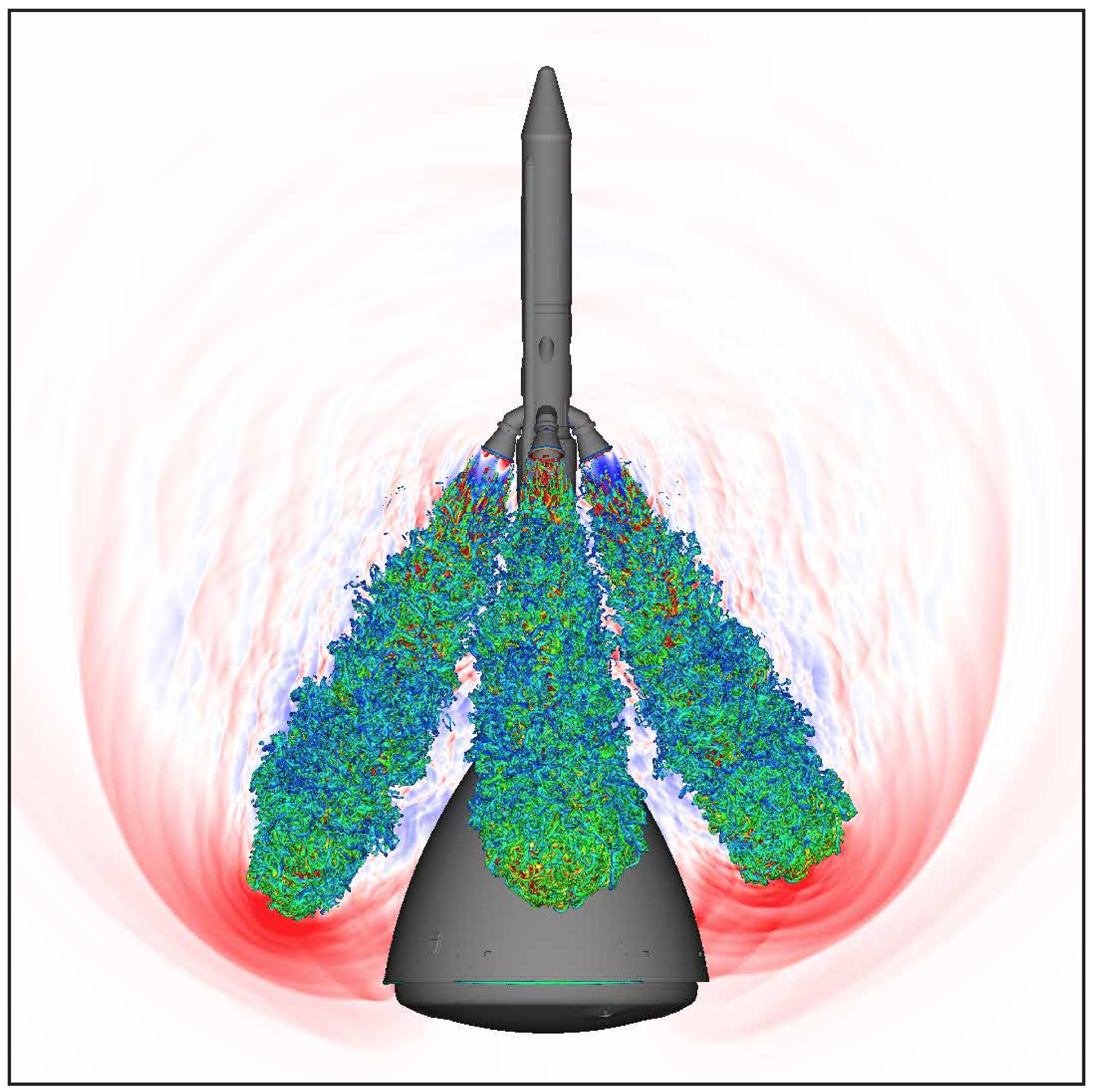


Numerical Schlieren image computed from a simulation of jet exhaust flow at near sonic speed, using the LAVA framework's curvilinear overset grid paradigm with a hybrid Reynolds-Averaged Navier-Stokes/Large-Eddy Simulation method. The picture aims to reproduce knife-edge photography used to highlight density changes in experiments. Dark regions depict low density, white regions are higher density. Sound waves appear as lighter grey. *Patrick Moran, Jeffrey Housman, NASA/Ames*



Snapshot from a pad abort simulation using LAVA's Cartesian grid paradigm, at about 0.08 seconds after ignition of the abort motors. The Orion spacecraft is shown in grey. Isosurfaces of the Q-criterion, colored by Mach number, are plotted to highlight turbulent structures. Gauge pressure is shown on the vertical plane, delineating the ignition overpressure waves and the acoustic waves emanating from the jet mixing layer. *Francois Cadieux, Michael Barad, NASA/Ames*

National Aeronautics and
Space Administration

Predicting Aircraft Noise and Spacecraft Acoustic Loads

Recent successes in accurately predic noise levels for aircraft and acoustic loads for spacecraft demonstrate the powerful capabilities of NASA's Launch, Ascent and Vehicle Aerodynamics (LAVA) framework. This success paves the way for the inclusion of more acoustic analysis in the detailed design of aircraft and spacecraft. Jet noise predictions will impact the design and placement of the engine for NASA's Low Boom Flight Demonstrator, a concept quiet supersonic aircraft. Tonal noise predictions for a realistic open rotor configuration will enable quieter open rotor designs. LAVA has provided accurate vibrational loads for spacecraft launch abort scenarios that influenced the final design of the Orion Launch Abort Vehicle. The efficient Lattice-Boltzmann approach will enable larger-scale, more accurate airframe and fan noise computations.

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Francois Cadieux, NASA Ames Research Center